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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,434	02/15/2005	Rene Djurup	DJURUP1	4128

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EXAMINER	
GUDIBANDE, SATYANARAYAN R	

ART UNIT	PAPER NUMBER
1654	

MAIL DATE	DELIVERY MODE
12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,434	DJURUP ET AL.	
	Examiner	Art Unit	
	SATYANARAYANA R. GUDIBANDE	1654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,27-38,40,53,54,57,58 and 73-81* is/are pending in the application.

4a) Of the above claim(s) *29,31,33,34,37,38,57,58,76 and 78-81* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,28,30,32,35, 36,40,53,54,73-75 and 77* is/are rejected.

7)☒ Claim(s) *27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action dated 3/19/08 has been withdrawn. Amendment made to the claims filed on 10/27/08 has been entered.

Election/Restrictions

Applicant's election without traverse of group I invention (claims 1, 27-40, 53 and 73) and SEQ ID NO. 595 as species in the reply filed on 4/30/07 was acknowledged in the office action dated 6/19/07.

Prior art search indicated that the elected species SEQ ID NO: 595 is free of art. The search was extended and prior art was found on SEQ ID NO: 604 and has been applied in the rejection below.

Claims 1, 27-38, 40, 53, 54, 57, 58 and 73-81 are pending.

Claims 57, 58, 80 and 81 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/30/07.

Claims 29, 31, 33, 34, 37, 38, 76, 78 and 79 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/30/07.

Claims 2-26, 39, 41-52, 55, 56 and 59-72 have been canceled.

Claims 1, 28, 30, 32, 35, 36, 40, 53, 54 and 73, 75 and 77 are examined on the merit.

Any objections and/or rejections made in the office action dated 3/19/08 and not specifically mentioned here are considered withdrawn.

Allowable Subject Matter

Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

New grounds of Rejections

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex*

parte Wu, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

In the present instance, claim 1 recites the broad recitation for the variables X^1-X^{19} as follows:

"wherein

(1) each of X^1 and X^{19} is, independently, either a sequence consisting of 2-5 amino acid residues or **a single amino acid residue**, and

(2) each of X^2- X^{18} is, independently, **a single amino acid residue**, and (lines 4-9)".

The claim also recites the following narrow recitation for the same variables X^1-X^{19} as follows:

"wherein

X^1 is a sequence consisting of 2-5 amino acid residues, or **an amino acid residue selected from Group 2**;

X^2 is **selected from Group 5**;

X^3, X^{15} and X^4 are **selected from Group 1**;

X^5 is Thr or **selected from Group 1**;

X^6, X^{11}, X^{12}, X^{13} and X^7 are **selected from Group 3**;

X^8 and X^{17} are **selected from Group 1, 3 or 4**;

X^9 is **selected from Group 5**;

X^{10} is **selected from Group 2, 3 or 4**;

X^{14} is Ser or **selected from Group 3**;

X^{16} and X^{18} is **selected from Group 1 or 3**;

X^{19} is a sequence consisting of 2-5 amino acid residues, or **a single amino acid residue selected from Group 5** (lines 11-24);

which are the narrower statements of the range/limitation.

Claims 28, 30, 32, 35 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The peptide sequence in claims 28, 30, 32, 35 and 40, comprises "Pro" residue in the variable "X^1" position. As per the proviso recited in claim 1, "X^1 includes Pro, then X^{19} is Gln", however, the peptide sequences recited in claims 28, 30, 32, 35, 36 and 40 do not have "Gln" at position X^{19}" as required by the proviso. Hence, there is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 36, 53, 54, 73-75 and 77 are rejected under 35 U.S.C. 102(b) as being anticipated by Pereira, et al., 1993, PNAS, 90, 4733-4737.

In the instant application applicants claim a peptide having the sequence of at most 44 amino acid residues comprising of the motif of the formula:

$$X^1\text{-}X^2\text{-Cys-}X^3\text{-}X^4\text{-}X^5\text{-}X^6\text{-}X^7\text{-}X^8\text{-}X^9\text{-}X^{10}\text{-}X^{11}\text{-}X^{12}\text{-}X^{13}\text{-}X^{14}\text{-}X^{15}\text{-}X^{16}\text{-}X^{17}\text{-Cys-}X^{18}\text{-}X^{19},$$

wherein, the various variables X^1-X^{19} are defined as shown in the table below with the proviso that X^1 when includes Pro, then X^{19} is Gln and wherein one of the following conditions applies:

(a) XI9 is Arg or Ala,

(b) X9 is Pro, Arg, or Gln,

(c) X19 is Gln and X1 includes Pro,

(d) X19 is 2-5 amino acid residues, or

(e) X10 is Asn or Gln.

Pereira, et al., discloses the following peptide, LRGGHFCGATLIAPNFVMSAAHCVA (page 4736, figure 6, sequence identified as ELAS) that corresponds to (SEQ ID NO: 604) of the instant application.

In the peptide LRGGHFCGATLIAPNFVMSAAHCVA:

Position	Amino acid selected from: as recited in the instant application	Pereira reference
X1	2-**5 amino acids** or R, K	LRGGH
X2	A,R,N,Q,G,H,I,L,K,M,**F**,P,S,T,W,V,Y	F
C	**C**	C
X3	A,**G**,S	G
X4	**A**,G,S	A
X5	**T**,A,G,S	T
X6	H,I,**L**,M,F,P,T,V,W,Y	L
X7	H,**I**,L,M,F,P,T,V,W,Y	I
X8	**A**,G,S,H,I,L,M,F,P,T,V,W,Y,N,Q	A
X9	A,N,R,Q,G,H,I,L,K,M,F,**P**,S,T,W,Y,V	P
X10	R,K,H,I,L,M,F,P,T,V,W,Y,**N**,Q	N
X11	H,I,L,M,**F**,P,T,V,W,Y	F
X12	H,I,L,M,F,P,T,**V**,W,Y	V
X13	H,I,L,**M**,F,P,T,V,W,Y	M
X14	**S**,H,I,L,M,F,P,T,V,W,Y	S
X15	**A**,G,S	A
X16	**A**,G,S,H,I,L,M,F,P,T,V,W,Y	A
X17	A,G,S,**H**,I,L,M,F,P,T,V,W,Y,N,Q	H
C	**C**	C
X18	A,G,S,H,I,L,M,F,P,T,**V**,W,Y	V
X19	2-5 amino acids or **A**,N,R,Q,G,H,I,L,K,M,F,P,S,T,W,Y,V	A

Since the sequence of Pereira does not have a proline residue at X1, and it does not have glutamine residue at position 19, hence, it meets the limitations of claims 1 and 36. Additionally, it has a proline at X9 position, Ala in position 19 and hence meets the limitations of claims 1, 74 and 77. Pereira discloses a peptide that meets the limitations of claim 1 and hence inherently capable inhibiting or stimulating secretion of cytokine IL-6 from monocytes. Hence reads on instant claims 53 and 54. Pereira also discloses that stock solutions were made up in sterile endo-toxin free water (page 4734, column 2, paragraph 1). Since the peptide is dissolved in sterile water, it meets the limitations for pharmaceutical composition of instant claim 73.

Hence, Pereira anticipates instant invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 36, 53, 54, 73-75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pereira, et al., 1993, PNAS, 90, 4733-4737 (hereafter referred to as **Pereira**) in view of US 6,107,460 (Pereira) (hereafter referred to as **'460 patent**).

In the instant application applicants claim a peptide having the sequence of at most 44 amino acid residues comprising of the motif of the formula:

X^1-X^2-Cys-X^3-X^4-X^5-X^6-X^7-X^8-X^9-X^{10}-X^{11}-X^{12}-X^{13}-X^{14}-X^{15}-X^{16}-X^{17}-Cys-X^{18}-X^{19},

wherein, the various variables X^1-X^{19} are defined as shown in the table below with the proviso that X^1 when includes Pro, then X^{19} is Gln and wherein one of the following conditions applies:

(a) XI9 is Arg or Ala,

(b) X9 is Pro, Arg, or Gln,

(c) X19 is Gln and X1 includes Pro,

(d) X19 is 2-5 amino acid residues, or

(e) X10 is Asn or Gln.

Pereira reads on the instant claims 1, 36, 53, 54, 73-75 and 77 as shown above in the anticipation rejection above. Pereira also discloses that the free sulphydryl groups and/or disulfide bridge positions at cysteine residues in CAP 37 (20-44 peptide) NQGRHFCGGALIHARFVMTAASCFQ (the N-terminal Asn (N) corresponds to position 20 and the C-terminal Gln (Q) corresponds to position 44) peptide at positions 26 and 42 required for optimum antibacterial activity. Instant peptide LRGGHFCGATLIAPNFVMSAAHCVA (SEQ ID NO: 604) is the elastase peptide (20-44) that shares significant homology (~40%) to the

CAP 37 peptide (column 1, paragraph 1 and as shown in figure 6, on page 4736) and exhibits the cysteine residues at positions at 26 and 42. Pereira also discloses that a combination of overall charge, hydrophobicity and the smaller size of peptides contributes the antibacterial activity of the CAP 37 (20-44) peptides (page 4737, column 1, paragraph 2).

Pereira does not discloses other mutations to the CAP 37 peptide that are encompassed by the instant application. '460 patent discloses that the antibacterial activity of CAP 37 (20-44) peptide is due to combination of charge, hydrophobicity, α-helical structure and presence of cysteine residues. Since combination of charge, hydrophobicity, α-helical structure and presence of cysteine residues is important for the antibacterial activity, the invention contemplates that certain amino acids are altered and/or substituted to enhance these features of the peptides. '460 Patent further discloses replacing serine at position 41 with His residue (column 8, lines 36-54). The instant application includes His residue in the Markush group for the X17 position. '460 Patent further contemplates that replacement of amino acids such as Gly that has low propensity for α-helix formation with high propensity α-helix forming Ala residues would likely increase the effect of α-helicity and hence enhances the antibacterial effect of CAP 37 peptide (20-44). '460 Patent discloses A→G (Ala for Gly) mutations at positions 27 and 28 (column 9, lines 8-20). The positions 27 and 28 of the CAP37 (20-44) corresponds to instant X3 and X4 positions that lists Ala residue in the Markush group. Further, '460 Patent discloses that Val at position 36 could be substituted with Leu, Ile or Ala and still provides an analog which maintained antimicrobial activity. It is further contemplated that one, two or all three Phe residues at positions 25, 35 and 43 could be substituted with Tyr residue (column 9, lines 35-46). The position 36 corresponds to instant X12 position that lists Val residue in the Markush group. The

positions 25, 35 and 43 corresponds to instant X2, X11 and X18 positions that lists Tyr residue in the Markush group.

It would have been obvious to one of ordinary skill in the art to combine the teachings of Pereira and '460 Patent to arrive at the instant invention. Because, the prior art as discussed above clearly illustrates that CAP37(20-44) peptide has antibacterial activity, the charge, hydrophobicity, presence of cysteine residues and α-helicity of the peptide is important in preserving and enhancing the antibacterial activity of the peptide. One would have been motivated to combine teachings of Pereira and '460 Patent, because, '460 Patent teaches that several mutations in CAP37 peptide have provided mutants that have retained the antimicrobial activity of the parent peptide. Further several mutations have been contemplated by the '460 Patent. A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was prima facie obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Claims 1, 36, 53, 54, 73-75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pereira, et al., 1993, PNAS, 90, 4733-4737 (hereafter referred to as **Pereira**) in

view of Starling, 1997, J. Exp. Med. Volume 185, Number 8, 1487–1492 and further in view of Goffin, 1992, Molecular Endocrinology, 6, 1381-1392.

In the instant application applicants claim a peptide having the sequence of at most 44 amino acid residues comprising of the motif of the formula:

X^1-X^2-Cys-X^3-X^4-X^5-X^6-X^7-X^8-X^9-X^{10}-X^{11}-X^{12}-X^{13}-X^{14}-X^{15}-X^{16}-X^{17}-Cys-X^{18}-X^{19},

wherein, the various variables X^1-X^{19} are defined as shown in the table below with the proviso that X^1 when includes Pro, then X^{19} is Gln and wherein one of the following conditions applies:

(a) XI9 is Arg or Ala,

(b) X9 is Pro, Arg, or Gln,

(c) X19 is Gln and X1 includes Pro,

(d) X19 is 2-5 amino acid residues, or

(e) X10 is Asn or Gln.

Pereira reads on the instant claims 1, 36, 53, 54, 73-75 and 77 as shown above in the anticipation rejection above. Pereira also discloses that the free sulphydryl groups and/or disulfide bridge positions at cysteine residues in CAP 37 (20-44 peptide) NQGRHFCGGALIHARFVMTAASCFQ (the N-terminal Asn (N) corresponds to position 20 and the C-terminal Gln (Q) corresponds to position 44) peptide at positions 26 and 42 required for optimum antibacterial activity. Instant peptide LRGGHFCGATLIAPNFVMSAAHCVA (SEQ ID NO: 604) is the elastase peptide (20-44) that shares significant homology (~40%) to the CAP 37 peptide (column 1, paragraph 1 and as shown in figure 6, on page 4736) and exhibits the

cysteine residues at positions at 26 and 42. Pereira also discloses that a combination of overall charge, hydrophobicity and the smaller size of peptides contributes the antibacterial activity of the CAP 37 (20-44) peptides (page 4737, column 1, paragraph 2).

Instant claims are drawn to a structure of the formula:

X^1-X^2-Cys-X^3-X^4-X^5-X^6-X^7-X^8-X^9-X^{10}-X^{11}-X^{12}-X^{13}-X^{14}-X^{15}-X^{16}-X^{17}-Cys-X^{18}-X^{19},

wherein amino acid residues at positions X1-X5, X8, X9 and X15-X19 has Ala and Ser residues in the Markush group.

Pereira does not discloses other mutations to the CAP 37 peptide that are encompassed by the instant application. However, Pereira discloses that a combination of overall charge, hydrophobicity and the smaller size of peptides contributes the antibacterial activity of the CAP 37 (20-44) peptides (page 4737, column 1, paragraph 2).

The instant invention contemplates substitution of Ala and Ser at positions X1-X5, X8, X9 and X15-X19 of the formula shown above to generate mutants of formula shown above. The substitutions of amino acids at selected positions in a peptide with Ala or Ser residues are well known in the art as "alanine scanning" (Goffin, 1992, Molecular Endocrinology, 6, 1381-1392) and "Serine Scanning" (Starling, 1997, J. Exp. Med. Volume 185, Number 8, 1487–1492). Goffin teaches generation of functionally equivalent i.e., immunologically indistinguishable mutants of hPRL mutants by alanine scanning technique (abstract). Starling teaches the technique of serine scanning to identify amino acid residues that are important in Fas-FasL receptor-ligand interaction (abstract). Starling found two mutants (K78S and H95S) bound FasL

comparably to wild type. Hence it is common practice to use alanine and serine scanning to identify mutants of peptides that bear the functionally equivalent peptides.

It would have been obvious to one of ordinary skill in the art to combine the teachings of Pereira, Goffin and Starling to arrive at the instant invention. Pereira discloses that a combination of overall charge, hydrophobicity and the smaller size of peptides contributes the antibacterial activity of the CAP 37 (20-44) peptides. Both Goffin and Starling have used Alanine and Serine scanning respectively to generate functionally equivalent peptides to the wild type. The instant claims are drawn to substitution at various positions such as X1-X5, X8, X9 and X15-X19 with Ala, Gly and Ser residues and hence one would be motivated to adopt the alanine and serine scanning techniques of Goffin and Starling to generate functionally equivalent CAP37(20-44) peptides of the instant invention.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was prima facie obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

EXAMINER'S COMMENT

It is suggested that claim 1 be amended as follows for the purposes of clarity.

1. (Currently amended) A peptide having a sequence of at most 44 amino acid residues comprising the formula:

X^1-X^2-Cys-X^3-X^4-X^5-X^6-X^7-X^8-X^9-X^{10}-X^{11}-X^{12}-X^{13}-X^{14}-X^{15}-X^{16}-X^{17}-Cys-X^{18}-X^{19},

wherein,

X^1 is Arg, Lys or a peptide consisting of 2-5 amino acids;

X^2 is Ala, Arg, Asn, Gln, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Val or Tyr;

X^3 is Ala, Gly or Ser;

X^4 is Ala, Gly or Ser;

X^5 is Thr, Ala, Gly or Ser;

X^6 is His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^7 is His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^8 is Ala, Gly, Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp, Tyr, Asn or Gln;

X^9 is Ala, Gly, Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp, Tyr, Asn or Gln;

X^{10} is Arg, Lys, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp, Tyr, Asn or Gln;

X^{11} is His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{12} is His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{13} is His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{14} is Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{15} is Ala, Gly or Ser;

X^{16} is Ala, Gly, Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{17} is Ala, Gly, Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp, Tyr, Asn or Gln;

X^{18} is Ala, Gly, Ser, His, Ile, Leu, Met, Phe, Pro, Thr, Val, Trp or Tyr;

X^{19} is Ala, Arg, Asn, Gln ,Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Val, Tyr or a peptide consisting of 2-5 amino acids;

with the proviso, that when X^1 includes Pro, then X^{19} is Gln, and wherein at least one of the following conditions (a)-(e) applies:

(a) X^{19} is Arg or Ala,

(b) X^9 is Pro, Arg, or Gln,

(c) X^1 includes Pro,

(d) X^{19} is a peptide consisting of 2-5 amino acid residues, or

(e) X^{10} is Asn or Gln.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satyanarayana R. Gudibande whose telephone number is 571-272-8146. The examiner can normally be reached on M-F 8-4.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Satyanarayana R Gudibande/
Examiner, Art Unit 1654

/Cecilia Tsang/
Supervisory Patent Examiner, Art Unit 1654